

COMMONWEALTH OF VIRGINIA
STATE CORPORATION COMMISSION

**STAFF REPORT OF
FINAL FINDINGS AND RECOMMENDATIONS**
DIVISION OF COMMUNICATIONS

CASE NO. PUC-2012-00042

**IN THE MATTER OF
INVESTIGATING 911 EMERGENCY
CALL SERVICE OUTAGES AND PROBLEMS**

January 17, 2013

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EXECUTIVE SUMMARY

The purpose of this report is to present the final findings and recommendations of the analysis performed by The Virginia State Corporation Commission Staff (“Staff”) regarding the 911 service outages following the June 29, 2012 storm (“June 29 Derecho”). A major focus is evaluating the sufficiency and extent of the corrective actions that Verizon is undertaking. The ultimate goal of this investigation is to help prevent such a serious and potentially life threatening event from occurring again. This report provides a number of recommendations to assist with achieving that objective.

Early in the afternoon on June 29, 2012, a severe and destructive storm with widespread wind gusts of over 70 mph tracked across a large section of the Midwestern United States. The storm progressed into the Mid-Atlantic States in the afternoon and evening. Late in the evening, the storm continued to expand and impacted significant portions of Virginia, Maryland, and the District of Columbia with severe straight-line wind speeds reported as high as 87 mph. By the morning of June 30, there was an unprecedented and critical loss of 911 services primarily impacting public safety answering points (“PSAPs”) and citizens in the Northern Virginia area.

Verizon acknowledged multiple problems starting with the failure of backup generators to start in the Fairfax and Arlington central offices. Ultimately there was a total loss of 911 telephone service to four public safety answering points (“PSAPs”) (Fairfax County, Prince William County, Manassas, and Manassas Park) for a significant period of time. In addition, 21 other Virginia PSAPS were impacted and experienced such problems as the failure to receive Automatic Location Information (“ALI”) and the loss of administrative and backup telephone lines.

On September 14, 2012, the Staff Report of Preliminary Findings was filed. The primary focus of our investigation for that report was determining the causes of the 911 outages. Overall, we have determined that our preliminary findings have been substantiated further and uncontested. A list of our preliminary findings is attached to this report as Attachment 1.

Our continued investigation has identified a number of additional significant findings. These findings go beyond assessing the impact from the June 29 Derecho as they identify and address (1) other maintenance and equipment problems identified by Verizon, and (2) certain of Verizon's corrective actions and proposals, both for areas affected by the Derecho and in other parts of Virginia.

Verizon has made significant progress in implementing numerous corrective actions it initiated shortly after the June 29 Derecho. We are pleased with Verizon's candor and direct approach in identifying the issues and problems. Particular recognition is given to Verizon for initiating power audits in central offices beyond those impacted directly by the June 29 Derecho. Some corrective actions were or are being implemented quickly and Verizon should continue to complete those initiatives as soon as possible.

However, our investigation also raises concerns about the overall condition of Verizon's equipment in its Virginia offices. There is evidence of an ongoing lack of routine maintenance in the audited offices. This raises concerns about the conditions existing in other Verizon offices. It will take a concerted effort on Verizon's part to correct all the problems. This cannot be done overnight and likely requires oversight to ensure compliance. Our recommendations include details of appropriate oversight and continued monitoring.

The 911 service outages after the June 29 Derecho put thousands of Virginia citizens at risk. Those outages were a direct result of Verizon's failure to perform the necessary

maintenance on its central office facilities, and were compounded by its inability or failure to monitor and respond, both internally and externally, to the outages. As the generator maintenance logs, audits, and other Verizon interrogatory responses reveal, Verizon has allowed equipment and facilities at many of its offices to deteriorate. This discovery indicates that Verizon should not devote its efforts solely on the sixteen 911 mission critical offices but should expand its corrective efforts to all its Virginia offices.

The risk of further 911 or other customer service outages cannot be mitigated without correcting the problems at all Verizon offices in Virginia. We recognize that they cannot be corrected overnight. Market and technology change is resulting in industry movement away from the traditional copper network, particularly for voice. However, the integrity of the telecommunications system, regardless of technology (i.e., VoIP, wireless, FIOS, etc.), still depends on properly functioning central office equipment, transport systems, switching equipment, and 911 services provided by the incumbent local exchange telephone company.

We applaud Verizon's efforts to identify and correct the underlying causes and problems, and are encouraged that no 911-related problems arose in Virginia during and following Hurricane Sandy. Ensuring that testing and maintenance is performed properly and timely in all of Verizon's offices should go a long way in preventing a similar 911 outage as the one following the June 29 Derecho. In addition, Verizon has modified many of its practices to ensure more timely response in emergency situations. These efforts should be monitored and evaluated for at least some period of time (i.e., 1-3 years) to ensure that Verizon continues to undertake the necessary corrective actions. Finally, Verizon and the Staff should continue to meet and cooperate with the PSAPs to ensure their concerns are addressed.

INTRODUCTION

Early in the afternoon on June 29, 2012, a severe and destructive storm with widespread wind gusts of over 70 mph (“June 29 Derecho”) tracked across a large section of the Midwestern United States. The storm progressed into the Mid-Atlantic States in the afternoon and evening. Late in the evening, the storm continued to expand and impacted significant portions of Virginia, Maryland, and the District of Columbia with severe straight-line wind speeds reported as high as 87 mph. The June 29 Derecho continued eastward during the very early morning of June 30 affecting Delaware and New Jersey, and ultimately dissipated around 4:00 a.m. in the Atlantic Ocean.

In Virginia, over one million customers lost power with many of those located in Northern Virginia. On the morning of June 30, Governor McDonnell declared a state of emergency. His announcement stated that “last night’s thunderstorms caused the broadest non-hurricane related power outage in Virginia history.”

By the morning of June 30, there was an unprecedented and critical loss of 911 services primarily impacting public safety answering points (“PSAPs”) and citizens in the Northern Virginia area. Subsequently, the Virginia State Corporation Commission (“Commission”) started receiving reports of 911 emergency call outages in the areas of Virginia served by Verizon Virginia LLC and Verizon South Inc. (collectively, “Verizon”), and unconfirmed reports of 911 service problems in the service territories of other providers. On July 3, the Commission issued an Order Establishing Investigation (“July 3, 2012 Order”) directing its Staff (“Staff”) to investigate the loss of 911 emergency call services from the June storms. The July 3, 2012 Order required the Staff to report its preliminary findings by September 14, 2012, and to file a report with its final findings and recommendations by December 31, 2012. At the Staff’s request, the

date for filing this report was extended to January 17, 2013.

In addition, on July 13, 2012, the Federal Communications Commission's ("FCC") Public Safety and Homeland Security Bureau released a Public Notice ("PSHSB Notice") seeking comments on 911 resiliency and reliability in the wake of the June 29 Derecho in PS Docket No.11-60. The PSHSB Notice recognized that the impact of the storm was particularly severe in Northern Virginia, notably in Fairfax County, parts of Prince William County, Manassas Park, and Manassas "where over 1 million people faced the possibility of not being able to call 9-1-1 successfully" and where "media reports and local government officials indicate that public safety answering points...failed as did backup systems."¹

PRELIMINARY FINDINGS REPORT

On September 14, 2012, the Staff Report of Preliminary Findings ("Preliminary Findings Report") was filed. The primary focus of our investigation for the Preliminary Findings Report was determining the causes of the 911 outages. Those findings showed that there were numerous and compounding errors, failures, and deficiencies on the part of Verizon that multiplied into a potentially catastrophic event exposing inherent weaknesses in Verizon's service and associated 911 network design and maintenance. A list of our preliminary findings is attached to this report as Attachment 1.

The Preliminary Findings Report recognized that Verizon had initiated numerous efforts to correct deficiencies exposed by the events surrounding the June 29 Derecho. The stated intent of our continued investigation was to evaluate more fully Verizon's corrective action plans going

¹ PSHSB Notice, p.1. Comments were filed in this proceeding by a number of parties, including Verizon, wireless carriers, Fairfax County and other localities, as well as public safety associations or entities. Reply comments were also filed by a number of parties. On January 10, 2013, the Public Safety and Homeland Security Bureau released a Report and Recommendations, "Impact of the June 2012 Derecho on Communications Networks and Services" ("PSHSB Report and Recommendations"). <http://apps.fcc.gov/ecfs/proceeding/view?name=11-60>

forward. Of particular concern was whether the generators in the Arlington and Fairfax offices had been properly maintained and tested. We were (and still are) concerned “whether such is indicative of a systematic deficiency throughout Verizon’s network.”²

STAFF INVESTIGATION

To date, the Staff has served Verizon with five sets of interrogatories consisting of 78 questions (many with multiple subsections). We have received and reviewed hundreds of documents (thousands of pages) provided by Verizon. We also met with various Verizon personnel on several occasions to discuss issues and responses in more detail. One meeting included an expansive tour of both the Arlington and Fairfax central offices on November 14, 2012. We have participated in meetings of the Governor’s Secure Commonwealth 911 Sub Panel, the National Capital Region Emergency Preparedness Council (which is part of the Metropolitan Washington Council of Governments (“COG”)), the COG 911 Directors, and Fairfax County officials. We also met with members of the PSAP community in Northern Virginia on December 20, 2012. In addition, on November 14, 2012, COG’s Telecommunications Network Steering Committee issued its Preliminary Report of 9-1-1 Service Gaps During and Following the Derecho Storm on June 29, 2012.³

A major focus of our investigation for this final report was to gather as much detail as possible to evaluate Verizon’s corrective action plans. We are seeking a better understanding of the depth and technical thoroughness of many of Verizon’s proposed actions. An important aspect of our effort is determining the scope and specific schedule for the proposed changes. In other words, how deep into the network does Verizon intend to go (i.e., how far beyond the

² Preliminary Findings Report, p. 12.

³ At its request, COG’s report was filed in this proceeding. A copy of the Executive Summary of its report is provided as Attachment 2 to this report.

Fairfax and Arlington offices) with the changes and how soon will they be completed?

Of particular concern is obtaining and evaluating the power audits conducted by Verizon as part of its corrective action plans. We recognize that those audits took time to perform; however, we did not receive all of the completed audits until December 4, 2012. We discuss some of our most immediate concerns from those audits later in this report.

DISCUSSION

Verizon has made significant progress in implementing numerous corrective actions it initiated shortly after the June 29 Derecho. We applaud those efforts and are pleased with Verizon's candor and direct approach in identifying the issues and problems. Particular recognition is given to Verizon for initiating power audits in central offices beyond those impacted directly by the June 29 Derecho. Some corrective actions were or are being implemented quickly and Verizon should continue to complete those initiatives as soon as possible. The improvements to Verizon's emergency management processes, updating manuals, providing additional training to its personnel, and revising generator testing procedures can be done quickly (and have been completed in many instances). We are encouraged by improvements to Verizon's documented generator maintenance/testing procedures, revisions to its National Power Network Operation Center ("NPNOC") procedures in identifying and responding to emergency conditions, and placement of readily available site specific emergency procedure manuals in Verizon's central offices. In addition, many of its corrective actions are directed (at least initially) to 16 Virginia offices that Verizon designates as its 911 mission critical offices.⁴

Our Preliminary Findings Report raised concerns that the generators in the Fairfax and

⁴ Verizon identified offices housing E911 Selective Router Tandems as 911 mission critical.

Arlington offices had not been properly maintained or tested and that could be indicative of a systematic deficiency throughout Verizon's network. We subsequently reviewed the generator maintenance logs in selected offices (cross section of locations and sizes) and found many instances of insufficient generator testing. We expect that if we look at the maintenance logs for other Verizon facilities in Virginia, we would see similar results. Verizon has implemented several corrective actions addressing generator maintenance and testing which should mitigate the potential for generator failures in the future. However, those practices must be adhered to in **all** Verizon facilities in Virginia, and most importantly must be continuously and routinely followed. We cannot forget that the 911 service outages following the June 29 Derecho would likely have been avoided if the generators in the Fairfax and Arlington offices had been maintained and operated as they were designed.

In addition, we are encouraged by the telemetry improvements that are being undertaken by Verizon. It is redesigning its telemetry network to eliminate the single point of failure structure that presently exists.⁵ Verizon's first step is to eliminate its dependency on Uninterruptible Power Supply ("UPS") as the primary power source by moving it to DC central office power. This action should help prevent the potential of a telemetry system failure occurring so quickly after a power outage because the UPS has a very limited reserve (i.e., 30 minutes in the Arlington office). The very early failure of the telemetry system after the June 29 Derecho made restoral efforts longer and more difficult. The longer term goal for redesigning Verizon's telemetry network in accordance with its diversity guidelines is appropriate and will

⁵ Verizon utilizes a telemetry network to monitor its central offices, respond to equipment alarms, and diagnose network problems from various remotely located and specialized network operations centers. The present telemetry arrangement provides for a group of central offices to be monitored from one telemetry hub. The redesign will provide for the ability for each central office to be monitored from two telemetry hubs.

provide an even greater safety net to allow for dual monitoring of its network in emergency situations.

While Verizon has been responsive to the issues identified following the June 29 Derecho, we are concerned about the overall condition of the equipment in its Virginia offices. There is evidence of an ongoing lack of routine maintenance in the audited offices. This raises concerns about the conditions existing in other Verizon offices. Verizon has initiated efforts to identify and remedy the problems in its 16 mission critical offices. However, it does not have a plan to conduct power audits in all other Virginia offices, or to conduct transport, switching equipment, or operational audits in any offices. There is not a simple or quick solution to the lack of attention to maintenance and necessary remediation. Verizon must continue to identify and remedy the deficiencies and properly maintain its facilities going forward. Moreover, Verizon should expand its remediation actions beyond the 911 mission critical offices to all other offices in Virginia.

FINDINGS⁶

Overall we have determined that our preliminary findings identified in the Preliminary Findings Report have been substantiated further and uncontested. However, our continued investigation has identified a number of additional significant findings. These go beyond assessing the impact from the June 29 Derecho as they identify and address (1) other maintenance and equipment problems identified by Verizon, and (2) certain of Verizon's corrective actions and proposals, both for areas affected by the Derecho and in other parts of Virginia. These findings are not all inclusive, but provide a good foundation and cross section of

⁶ All quoted material in these findings was obtained from various Verizon provided documents, including interrogatory responses, audits, and corrective action updates.

issues for evaluating the sufficiency of Verizon's corrective action plans. A copy of Verizon's most recent corrective action plan is included as Attachment 3.

Our investigation has identified the following additional findings:

Generator Maintenance, Testing, and Practices

- A review of the 2011 and 2012 backup generator maintenance logs prior to the June 29 Derecho in a cross section of central offices in Virginia shows a lack of compliance with Verizon's maintenance and testing procedures.
- Routine testing was not always performed and in a number of instances the testing duration was insufficient (i.e., a test should run the generator under load continuously for at least one hour **every** month and for five hours once a year). There were some instances where generators were run considerably less than an hour in a single month and in some cases not at all.
- Verizon has "reviewed and refreshed its monthly and annual preventative maintenance requirements for generator, battery and DC plant rectifiers for all its host offices."
- Verizon enhanced its Blackout Testing⁷ procedures (as of September 2012) to include "failed automated controls" and "prioritized system load transfer" scenarios. Verizon plans to perform blackout tests for its 16 Virginia 911 network critical sites in 2013, scheduling each site once all the power audit findings have been addressed. It is also in the process of identifying which other facilities will be blackout tested in 2013.
- Verizon has deployed standardized log books in its offices and implemented an online tool to track monthly and annual generator testing.
- Verizon has formalized its generator test reporting and failure reporting procedures.

⁷ Blackout testing simulates the loss of commercial power and, among other things, determines that the generators automatically start and office loads are automatically shifted from commercial power sources to the generators(s).

These procedures include an acknowledgement process for all generator run alarms by the responsible Network Operations Center (“NOC”) and a separate operational process “to audit the generator run testing frequency compliance.” Records will be maintained locally as well as by the NOC.

- Verizon is installing a street side quick connection for a portable generator at all 911 mission critical offices to be completed as follows: ten in 1Q 2013, five in 2Q 2013, and one by July 2013.
- A third permanent generator will be installed in the Arlington office by 3Q 2013.

Telemetry

- Verizon is redesigning its telemetry network to “include more diverse connections and failover (alternative) locations.”
- Verizon plans to reduce the telemetry system dependency on UPS by moving the telemetry equipment to a DC central office power source. This effort will provide additional operational duration for telemetry in the event of a commercial and generator power outage.
- DC powered routers were installed at the Arlington central office on January 3, 2013.
- Verizon plans to redesign its telemetry network so that core routers, which receive data from edge routers, will have central office generator and battery back up by June 30, 2013.⁸
- Verizon is implementing site by site remediation to move all telemetry traffic to the IP network. The 911 mission critical offices should be completed by December 31, 2013.

⁸ “Edge routers” are deployed in each Verizon central office. They collect all of the alarms and other messages generated by the network equipment. Those edge routers then send that data to “core routers” – regional aggregation points that distribute them to the appropriate operations support systems for analysis and action by NOC personnel.

- The ongoing telemetry redesign schedule for the remaining Verizon offices (nationwide) is based on office size (starting from largest to smallest) with an indicated completion by December 31, 2015. This redesign will eliminate a single point of failure for the telemetry system allowing Verizon to maintain visibility to its central offices from an alternative location if necessary.

Power Audits

- Following the Derecho, Verizon initiated and completed backup power system audits for its other 911 mission critical facilities in Virginia that were not affected by the Derecho. It has completed backup power system audits for all of its 911 mission critical facilities.
- The audits did not include assessment of switching or transport equipment.
- The audits surveyed the overall condition of the power, grounding, and battery room systems at each facility and were generally “non-intrusive and visual in nature.”
- The audits also included an infrared thermographic scan of major system components.
- Inspections of mechanical, HVAC equipment, and building conditions were also performed in conjunction with the power audits in the 911 mission critical offices.
- The audits conducted in a few of the offices were primarily narrative in nature while the other audits used a survey template format with a pass/fail test.
- The infrared thermographic scans identified variations in temperature readings (hot spots) in electrical equipment (i.e., connections, fuses, and circuit breakers) to diagnose problems (i.e., loose mechanical connections or circuit overloads) that could potentially cause issues (i.e., from fires to equipment failures).
- The audits were not operational in nature and Verizon recognizes that “depending on the severity of any abnormalities found (if any) then a more in-depth audit of the affected

systems will have to be scheduled.” We are not aware of further in-depth audits scheduled in any of the sixteen 911 mission critical offices.

- The audits for the 911 mission critical offices in Virginia identified hundreds of abnormalities. The underlying issues found in the audits ranged from minor to critical.
- Many of the audits show a broad range of problems from overall building deterioration to apparent lack of routine preventative maintenance.
- Examples of minor issues found in the various audits include low electrolyte levels in batteries, cracked flame arrestors on batteries, and safety equipment missing or depleted.
- The audits found instances where power equipment (i.e., battery strings, rectifiers, inverters) in the offices was known to be manufacturer discontinued and spare parts were not available on site or from the manufacturer. In many instances, the audits recommended replacing the manufacturer discontinued equipment. One audit stated “the obsolete rectifiers put the switch at risk due to lack of spare parts.”
- Verizon indicates that it has access to spare parts in other locations and from third party vendors. In addition, Verizon retains parts from old, replaced equipment to use as spares.
- A number of the audits identified that annual Battery Run Down Tests (“RDT”) had not been performed in some time. In one office, the audit stated the “battery plant reserve sizing is not sufficient to carry the load for four hours” and it was noted that the RDT had not been performed since 2009.
- There was evidence of roof leaks in several offices.
- The audits identified nonfunctioning and inadequate HVAC systems in some offices. For example, some air handling and condensing units were out of service at the time of the audits and the temperatures in the battery and equipment rooms exceeded acceptable

levels.

- The thermographic scans identified circuit breakers and fuses in a number of offices as being hotter than the surrounding equipment and posing a potential fire or failure risk.
- At one office, a brick veneer wall was falling on to the adjacent property of a U.S. post office. There are numerous indications of building deterioration in many offices.
- In addition to scheduled inspections, Verizon will conduct backup power system audits in facilities other than 911 mission critical offices based on “field requests or direction from the engineering teams.” For example, items noticed in other inspections and activities in an office may trigger a field request for a power audit.
- The audits in several offices identified instances where power rectifiers were not operational, needed to be repaired, or were improperly located.
- Verizon has addressed and repaired many of the problems identified in the audits and has stated it is committed to rectifying all problems indentified therein.

Other Initiatives

- Outside the power audit process, Verizon inspected during August and September of 2012 all its Virginia central offices under its annual “Neat, Clean, Safe and Reliable” central office inspection program.
- According to Verizon, this program has resulted in hundreds of work action items in over 300 Virginia offices.
- The work action items are categorized and prioritized into three groups: Network Reliability, Safety/Security, and Neat Clean.
- Verizon has completed the work on many of these work actions and plans to address all items identified in the Virginia offices.

- Verizon accelerated its “Original Equipment Manufacturer Preventative Maintenance” program that it had planned for 2013 into 4Q 2012. Under this program, the original equipment manufacturer (“OEM”), or a qualified OEM vendor, performs an annual checklist of maintenance items. During 4Q 2012, Verizon completed this program in 222 offices nationwide, including 29 in Virginia.
- Verizon has deployed additional diversity in its long haul network and has retired some specific transport systems that were at the end of their life.
- Verizon has completed a bar code inventory of all plug-in equipment for its legacy local network.

Emergency Practices and Procedures

- Verizon revised its National Power Network Operation Center (“NPNC”) storm/emergency handling procedures.
- The revised NPNC procedures were expanded to address “unplanned” significant natural events or storms. The NPNC will declare a “storm/emergency event” during an unplanned event when there are five or more battery on discharge (“BOD”) alarms in the same geographic area.
- When a storm/emergency event is declared (from either a forecasted or unplanned event), the NPNC will contact the Global Event Network Management Center (“GENMC”) and the GENMC will then convene a conference bridge to outline a strategy plan.
- The NPNC will no longer suspend notifications of BOD alarms to the field during storm emergencies. All escalations to the dispatch centers and field power managers will continue during such emergencies.
- Verizon is adding an additional power technician to its evening shift in Northern

Virginia. In addition, “Verizon has modified its work schedule to designate Arlington and Fairfax offices as the primary reporting location....”

- Verizon placed a readily available copy (or copies) of a site specific “Central Office Emergency Procedure Manual” in its 911 mission critical offices that identifies and maps the power and generator procedures for the specific office.
- Verizon has centralized its emergency activation processes with its Business Continuity and Emergency Management (BCEM) organization to expedite prompt responses to unforeseen emergencies.

911/PSAP

- As part of its corrective actions, Verizon has agreed to implement a number of initiatives requested by the PSAPs.
- Verizon is developing a centralized system to access the PSAP’s 911 infrastructure information and is working with the PSAPs to make this available to them.
- Verizon is working with PSAPs in Northern Virginia to recommend design changes to improve diversity and infrastructure inventory.
- All Northern Virginia PSAPs have been provided with design change recommendations.
- Verizon plans to complete its diversity review for all PSAPs in Virginia by year end 2013.
- Verizon plans to conduct a drill or exercise with each requesting jurisdiction on a semiannual basis that models potential or actual 911 outages. In early December, Verizon conducted a pilot exercise with the City of Norfolk.
- The PSAPs appear to be encouraged by the actions being undertaken by Verizon’s current operational management but still have concerns about the sustainability,

adequacy, and timing of the proposed corrective actions.

RECOMMENDATIONS

Our goal for this investigation is to help prevent such a seriously and potentially life threatening event from occurring again. We recognize that there are no “absolutes” to prevent another 911 service outage. However, the 911 outage following the June 29 Derecho in Northern Virginia should not have occurred and was avoidable if Verizon had properly maintained the generators in the Arlington and Fairfax offices. Nonetheless, the 911 outage and subsequent Verizon investigation exposed numerous deficiencies and weaknesses inherent in its procedures, processes, and central offices.

Our investigation shows that Verizon has resolved many problems, and is initiating actions to correct additional deficiencies. However, it will take a concerted effort on Verizon’s part to correct all the problems. This cannot be done overnight and likely requires oversight to ensure compliance. Therefore, we recommend the following:

- This docket should remain open.
- Verizon should be required to update and file quarterly corrective action progress reports with the Commission.
- Verizon should correct all deficiencies and implement all recommendations identified in its power audits.
- Verizon should meet quarterly with the Staff to provide additional details, schedules, budgets, and updates on its corrective actions, audits, inspections, and other initiatives intended to correct its deficiencies in Virginia.
- Verizon should continue to meet and cooperate with the PSAPs to ensure their concerns

are addressed.

- By the end of 1Q 2013, Verizon should develop and review with the Staff a schedule to conduct audits (including power, mechanical, and HVAC equipment) in all remaining Virginia offices. Verizon should permit the Staff to monitor any audit as it is conducted.
- Recognizing the time required to complete the audits, at a minimum, batteries should be inspected and tested in all Virginia locations by the end of 2Q 2013.
- Verizon should provide the Staff with copies quarterly of any additional or revised power audits conducted for offices in Virginia.
- Verizon should provide the Staff with any plans to conduct additional inspections or audits for switching and/or transport equipment and operational audits in Virginia.

Copies of the results from any such inspections and audits should be provided to the Staff on a quarterly basis.

- Verizon should establish a plan to address the availability and sufficiency of spare parts for manufacturer discontinued equipment.
- The Staff should continue to communicate and meet with PSAPs and the 911 community.
- Verizon should maintain and update a complete inventory of its 911 service infrastructure.
- Verizon should provide a quarterly report to the Staff identifying any problems found in the monthly testing of generators in offices in Virginia. The report should identify the office and the corrective action undertaken and include applicable dates.
- The Staff should file an annual status report with the Commission that includes recommendations on continuing the various requirements on Verizon and/or

recommendations on any changes or additions to such.

- The Staff should evaluate the FCC Public Safety and Homeland Security Bureau's Report and Recommendations released on January 10, 2013,⁹ and advise the Commission of any additional recommendations we may determine are warranted based on that report.

CONCLUSION

The 911 service outages after the June 29 Derecho put thousands of Virginia citizens at risk. Those outages were a direct result of Verizon's failure to perform the necessary maintenance on its central office facilities, and were compounded by its inability or failure to monitor and respond, both internally and externally, to the outages. As the generator maintenance logs, audits, and other Verizon interrogatory responses reveal, Verizon has allowed equipment and facilities at many of its offices to deteriorate. This discovery indicates that Verizon should not devote its efforts solely on the sixteen 911 mission critical offices but should expand its corrective efforts to all its Virginia offices.

The risk of further 911 or other customer service outages cannot be mitigated without correcting the problems at all Verizon offices in Virginia. We recognize that they cannot be corrected overnight. Market and technology change is resulting in industry movement away from the traditional copper network, particularly for voice. However, the integrity of the telecommunications system, regardless of technology (i.e., VoIP, wireless, FIOS, etc.), still depends on properly functioning central office equipment, transport systems, switching equipment, and 911 services provided by the incumbent local exchange telephone company.

We applaud Verizon's efforts to identify and correct the underlying causes and problems,

⁹ On January 10, 2013, FCC Chairman Genachowski announced plans to strengthen the reliability and resiliency of the nation's 911 services during major disasters. A copy of that public announcement is attached to this report as Attachment 4.

and are encouraged that no 911-related problems arose in Virginia during and following Hurricane Sandy.¹⁰ Ensuring that testing and maintenance is performed properly and timely in all of Verizon's offices should go a long way in preventing a similar 911 outage as the one following the June 29 Derecho. In addition, Verizon has modified many of its practices to ensure more timely response in emergency situations. These efforts should be monitored and evaluated for at least some period of time (i.e., 1-3 years) to ensure that Verizon continues to undertake the necessary corrective action.

¹⁰ While not of the magnitude or seriousness of the June 29 Derecho in Virginia, Hurricane Sandy caused commercial power loss to three Verizon central offices in Virginia, including Arlington, and the generators automatically started in all.

Attachment 1

SEPTEMBER 14, 2012 STAFF REPORT

PRELIMINARY FINDINGS

- Commission Rule 20VAC 5-425-40 A 1 requires a LEC providing 911 service to “design, construct, maintain, and operate its facilities to minimize interruptions to E-911 services.”
- Verizon was the only LEC in Virginia that experienced significant 911 service problems following the June 29 Derecho.
- The total loss of 911 capabilities to the Prince William County, Fairfax County, Manassas, and Manassas Park PSAPs was an extremely serious event and it is very fortunate that there were not catastrophic consequences to any citizens in Northern Virginia
- The Prince William County, Fairfax County, Manassas, and Manassas Park PSAPs were fully prepared to respond to the June 29 Derecho and were not responsible for the 911 service failures.
- The cause of the 911 service outages in Northern Virginia from the June 29 Derecho began with the failure of two backup generators that did not start automatically when commercial power was lost. Specifically, a generator in each of Verizon’s Arlington and Fairfax central offices did not start.
- A review of the maintenance logs for the backup generators in the Arlington and Fairfax central offices shows a lack of compliance with Verizon’s maintenance and testing procedures.
- The generator that failed to start in the Arlington office did not start during routine testing conducted two days before the June 29 Derecho. The maintenance log indicated that

work to the generator was needed.

- A total of nine generators (out of 136) failed to operate properly during the commercial power outages from the June 29 Derecho in Verizon's Mid-Atlantic region.
- The scope of 911 problems went well beyond the calling areas served by the Arlington and Fairfax central offices.
- ALI is an important component of 911 service. The lack of delivery of ALI to many PSAPs could have put citizens across Virginia at greater risk.
- The initial battery on discharge ("BOD") alarm¹ for the Fairfax central office was sent to the National Power Network Operation Center ("NPNC") at 10:29 p.m. on June 29, 2012 when the one generator failed to start. Under Verizon's procedures, any BOD alarm should have been seen as a **critical** power alarm requiring immediate action. However, according to Verizon, this alarm was incorrectly categorized as a **major** power alarm condition when sent to the NPNC.
- The Regional Network Center ("RNC") received a repair ticket (identified as a **major** alarm as mentioned above) from the NPNC for the Fairfax central office at 10:32 p.m. on June 29, 2012. At that time, and on the morning of June 30, the RNC was only working **critical** alarms and a power technician was not dispatched to the office until after the backup batteries had drained completely.
- The telemetry system (alarm monitoring) in the Arlington central office was only supported by the Uninterruptable Power Supply ("UPS") (i.e., battery power source)

¹ BOD or battery on discharge usually indicates one of two conditions. One is an all rectifier failure with or without a generator or commercial power failure, and second is a commercial power failure with generator failure. In each situation the office batteries are being depleted and the alarm condition is a CRITICAL indicator that network service is in jeopardy.

which was designed with a 30 minute reserve. The UPS failed at 11:23 p.m. on June 29, 2012.

- The very early failure of the telemetry system resulted in Verizon being unable to receive further alarms and remotely access its switches to monitor, test, or reroute traffic to 34 sites in the area. Verizon's inability to monitor its facilities and network in the Northern Virginia area significantly impacted the restoral process from the June 29 Derecho.
- The delay in identifying and repairing the critical conditions in the Fairfax and Arlington offices resulted in unnecessary damage to Verizon's network and extended the 911 problems and outages. There were hundreds of damaged or impacted pieces of equipment in those two offices (i.e., circuit cards and digital cross connects).
- The loss of the transport systems in the Arlington and Fairfax central offices was profound and collectively resulted in 17 switches becoming SS7 isolated, and therefore incapable of completing (originating or terminating) any interoffice local, long distance, or 911 emergency calls. The loss of those transport systems was also responsible for the loss of ALI to the PSAPs.
- Verizon did not activate its emergency Area Control Center located in Maryland until 10 a.m. on June 30, 2012.
- Verizon did not always provide sufficient, accurate, or timely communications to the affected PSAPs regarding its 911 problems and outages following the June 29 Derecho.
- Some battery reserves supporting major equipment systems in the Arlington (other than telemetry) and Fairfax central offices were depleted within approximately 3 to 5 hours. In addition, some equipment in those offices failed even before the batteries exhausted because of sensitivity to low voltage conditions.
- In many instances, Verizon's workforce was not timely dispatched, prepared, or trained

to recognize or correct the critical conditions from the June 29 Derecho.

- Verizon is making progress in implementing its corrective action plan, however, at this time, not all items have been fully defined or timelines determined.

Attachment 2

**PRELIMINARY REPORT of 9-1-1
SERVICE GAPS DURING and
FOLLOWING the DERECHO STORM
on JUNE 29, 2012**

Metropolitan Washington Council of Governments
9-1-1 Telecommunications Network Steering Group

November 14, 2012



EXECUTIVE SUMMARY

The 9-1-1 Emergency Call System is the vital link to public safety assistance across the country, providing access to police, fire and emergency medical services. Residents and visitors in cities, towns and rural communities are confident that accessing 9-1-1 will result in saving lives and property. It is the public's expectation that the responsibility of public safety and local and state government officials is to assure that the fees and charges assessed for 9-1-1 service are used to provide continuous and reliable public safety service. The National Capital Region (NCR), as the nation's capital and a major urban center, must have a reliable 9-1-1 system.



Figure 1: Basic 9-1-1- Call Flow

Late on the evening of Friday, June 29, 2012, a severe storm (Derecho) hit the Mid-Atlantic region with unusually intense straight-line winds. The storm caused widespread commercial electric power and communications outages in Washington D.C., Virginia, Maryland and additional states. At approximately 7:30 AM on Saturday, June 30, 2012, the 9-1-1 centers in Fairfax County, Prince William County, Cities of Manassas and Manassas Park experienced a complete failure of Verizon's 9-1-1 and telephone service. Three additional 9-1-1 centers, Arlington County, City of Alexandria and Loudoun County experienced a partial failure of these services. Verizon's restoration of 9-1-1 service began at approximately noon on Saturday, but some of the issues continued for over 5 days until July 4th, 2012.

Metropolitan Washington Councils of Governments Response

While the states and federal government regulate telecommunication utilities, 9-1-1 connects people in need with local governments. Thus, the failure of this system as a result of the Derecho became an issue of great concern to the Metropolitan Washington Council of Governments (COG), an association of 22 local governments that represent over 5 million residents. In addition, there have been previous issues with 9-1-1 service, that have been brought to Verizon's attention as indicated in a letter to Verizon from COG dated July 21, 2011.

On July 11, 2012, at its regular meeting, COG Board of Directors unanimously adopted R36-2012 Resolution to Encourage Steps to Address Verizon 9-1-1 Service Gaps During and Following the Derecho on June 29, 2012 which included the five items below

- Cause of Verizon's 9-1-1 failure;
- Existing redundancy and backup capabilities;
- Vulnerability of newer technologies that required battery or back-up power, including home and business service;

- Opportunities for COG localities to influence and strengthen regulatory oversight and remedies at the state and federal levels;
- Verizon's communication and messaging to the public and local emergency response officials concerning 9-1-1 services

COG formed a task force of 9-1-1 Center Directors and other interested parties to address the five items in the resolution. The following are the preliminary findings of the task force.

1. Cause of Verizon's 9-1-1 Failure

The loss of commercial power and the subsequent failure of one of two backup generators in each of Verizon's Arlington and Fairfax Central Offices (CO) were the predominant causes of the 9-1-1 service outages.

- The Derecho impact on the electrical infrastructure caused the loss of commercial power to the Verizon facilities located in Arlington and Fairfax, Virginia and elsewhere.
- The back-up generator, in the Fairfax CO, that supported 9-1-1 systems did not start
- In addition, the back-up generator in the Arlington CO, that supports Verizon's ability to view, monitor and identify problems in its network, did not start.
- Verizon had failed to identify or resolve previously identified maintenance issues with these generators; air in the fuel lines or faulty automatic fail-over switches, incorrect log entries and corrective action.
- Verizon's technician dispatched to Fairfax CO, on the morning of Saturday, June 30, 2012, did not realize, and took several hours to identify, that the generator supporting the 9-1-1 infrastructure was not operating. The delay allowed the batteries to drain resulting in the loss of 9-1-1 services.
- Both the Verizon Arlington and Fairfax facilities were supported by back-up battery power, but these batteries drained.
- Verizon failed to successfully implement any mitigating action to restore these two generators prior to the battery back-ups expiration.
- Once the battery supplies were exhausted both the ability to view and identify problems and 9-1-1 systems at the Verizon Arlington and Fairfax facilities failed.
- In addition, damage and failure of other 9-1-1 supporting systems within the Verizon network and infrastructure, such as the ability to receive the callers location, severely contributed to the 9-1-1 outage. However, these were largely cascading effects related to the loss of adequate backup power in Arlington and Fairfax COs.

2. Existing Redundancy and Backup Capabilities

This report addresses the three major components of 9-1-1 services from both the 9-1-1 Service Provider (Verizon) and Public Safety Agencies perspective to include Power, Network and 9-1-1 center

- Power

Verizon and other telecommunications providers and many of the 9-1-1 centers have designed and implemented backup power systems in most of their critical facilities that include generators and backup battery supplies in case of commercial power failure. In some cases they have worked with the local power companies to implement dual power sources from separate power feeds.

In the case of the Derecho on June 29, 2012, the 9-1-1 center and other telecommunications providers' backup power systems generally operated as designed and continued to provide required power until commercial power was restored. The generator issues experienced by Verizon, however, had significant impacts.

- Network

Verizon's network to provide 9-1-1 services includes multiple levels of diversity and redundancy, as well as back-up power in critical facilities, to optimize resiliency during a crisis.

- 9-1-1 Centers

Most of the critical systems and facilities, including servers, workstations, and databases, within the 9-1-1 centers have redundant components that are designed to provide continuous service and mitigate any downtime. In addition, many of the 9-1-1 centers have backup locations where calls can be routed in the case of major outages or the loss of the primary 9-1-1 center. In the case of the Derecho event, many of the backup 9-1-1 centers' services were provided through the Verizon Arlington and Fairfax locations, and thus were also unable to receive emergency calls.

3. Vulnerability of Newer Technologies that Require Battery or Back-Up Power, Including Home and Business Service

For many decades, power for traditional telephone service for most residences and small businesses was supplied via the hard wire connection through the telephone lines and therefore the loss of commercial power often did not result in the loss of dial tone or telephone service. Today, the widespread use of cordless phones which depend on commercial and limited battery power, results in the loss of telephone service during power outages.

Certain more recent technologies such as Voice over Internet Protocol (VoIP) or Standard Internet Protocol (SIP) rely on a modem or router located on premise or within a computer. With the use of these technologies, the loss of power causes the loss of telephone service and access to 9-1-1 once the back-up battery contained within the equipment, drains.

Some commercial or business telephone systems, primarily for smaller businesses, might also require power to operate properly. In addition, mobile telephone service, when a high volume of calls are being attempted into the mobile network at the same time, can cause network congestion and/or blockage. Also, the loss or failure of the mobile infrastructure, such as physical damage to cell sites, or network connectivity, can impact the ability to make and receive mobile calls and therefore access to 9-1-1.

4. Opportunities for COG Localities to Influence and Strengthen Regulatory Oversight and Remedies at the State and Federal Levels

At the time of this preliminary report there are five proceedings related to the Derecho and its impact on 9-1-1 services.

It is anticipated that reports will be issued by these various groups which will be incorporated into the final version of this report.

Within the proceedings, listed below, authorities in the COG region should encourage the adoption of new rules that would require Verizon, and other 9-1-1 service providers to adhere to high standards of operation to better ensure and support 9-1-1 service or face penalties.

1. Virginia SCC Case No. PUC-2012-00042

<http://www.scc.virginia.gov/case/PublicComments.aspx>

2. FCC PS Docket No. 11-60

<http://www.fcc.gov/document/pshsb-seeks-comment-effects-derecho-storm-communications>

3. Virginia Secure Commonwealth Panel – 9-1-1 Sub Panel

4. Maryland Public Service Commission Case No. 9298

http://webapp.psc.state.md.us/Intranet/Casenum/CaseAction_new.cfm?CaseNumber=9298

5. Maryland Emergency Number Systems Board (ENSB) Inquiry

5. Verizon's Communication and Messaging to the Public and Local Emergency Response Officials Concerning 9-1-1 Services

Public messaging was needed not only from the public information officers (PIOs) supporting the 9-1-1 centers, but from the utility itself. As part of the overall system of disseminating information to the public, Verizon needed to be part of the many voices with the common message that the 9-1-1 system was down. Verizon should have pointed to the local officials' guidance on what the public should do in case of an emergency, especially during this event, when everyone was challenged by lack of electricity, phones and connectivity. Officials needed a more robust public messaging response on Verizon's part to complement local government efforts. In these reports, Verizon states it is mobilizing a more robust emergency response communications process to ensure that media outlets and other channels are provided relevant information on a timely basis.

Verizon's first responsibility, in a service interruption, is to notify the 9-1-1 center. Then in its role as a local utility, in cooperation with local government, Verizon has the responsibility in providing enhanced customer service, to inform the public of 9-1-1 interruptions. This should include dissemination of information about the extent of the problem and when it will be resolved. PIOs and 9-1-1 centers should remain the primary source of guidance to the public during an emergency.

Recommendations

On July 19, 2012 the Northern Virginia 9-1-1 Directors (City of Alexandria, Arlington County, Fairfax County, Prince William County and Stafford County), and subsequently all of the 9-1-1 Directors in the COG Region, concurred on five recommendations which were accepted by Verizon and are in various stages of completion.

1. Adoption of the National Incident Management System (NIMS) Model (www.fema.gov/national-incident-management-system)
2. 9-1-1 Interruption Notification
3. Semi-annual 9-1-1 Outage Drill
4. Monthly update of contact list
5. Verizon Emergency Operations Center (EOC) Representative

In addition to the recommendations of COG 9-1-1 Directors released in the aftermath of the Derecho event, which Verizon should continue to implement, there are several other recommendations from COG 9-1-1 Telecommunications Network Steering Group and 9-1-1 Directors that should be considered and are outlined below.

1. Federal and State Regulatory Authorities should strongly encourage Verizon and other 9-1-1 service providers to perform a comprehensive independent audit of the entire infrastructure, processes and procedures that support 9-1-1 service and related systems, to assure the reliability and continuity of 9-1-1 service under any circumstance. Based on the results of these audits, comprehensive plans and strategies should be developed to immediately resolve any findings. The results of these audits and resolution plans should be made available to the 9-1-1 stakeholders.
2. It is highly recommended, that Verizon and other 9-1-1 service providers should provide subject matter expertise and make recommendations to the 9-1-1 centers and their stakeholders to assure reliability and continuity of 9-1-1 service. This should include, but not be limited to, network redundancy, 9-1-1 center equipment and systems, and best practices and procedures.
3. It is critical, that Verizon review their communications and public notification plans with each 9-1-1 center's communicators and/or Public Information Officers (PIO) regarding the dissemination of emergency messages (using both traditional and social media) to the public during 9-1-1 outages and update as needed. This process should also explore alternative methods to communicate with the public in case of widespread power and telephone outages. Verizon should coordinate with National Capital Region communicators/PIOs during any future outages, to inform and keep the public updated, and amplify the 9-1-1 center-specific public messages and information.
4. Verizon should keep the public informed of any service issues, the extent of the outage and time for resolution.
5. Federal and State Regulatory Authorities should evaluate the steps and actions of Verizon, related to this event, and the above audits, to ensure Verizon has adequately resolved all issues

and continues to improve their processes and infrastructure to ensure reliability and continuity of 9-1-1 service.

6. COG members and localities should work with their State and Federal regulatory authorities and Legislators, as needed, to assure, through proper oversight, best practices and procedures by establishing service level agreements to ensure reliability and continuity of 9-1-1 service.
7. It is recommended that there be further investigation by State and Federal Regulators, on whether the 9-1-1 supporting infrastructure of other telecommunications providers other than Verizon, was also impacted by the Derecho. As an example, AT&T Wireless in their comments to FCC PS Docket No. 11-60, indicated there was some impact to their infrastructure during and after the Derecho.

By all indications during this event, the systems and processes in place by the public safety agencies in the COG region, operated as designed, and the 9-1-1 centers were fully prepared to provide service to the public. But, there are some items, which need to be considered, by local and state government officials, to ensure future reliability and continuity of 9-1-1 services which are as follows.

1. State and local 9-1-1 authorities should be encouraged to perform a full assessment of their current 9-1-1 systems and operations to assure reliability and continuity of 9-1-1 service.
2. It is recommended that State and Federal regulatory authorities, review current laws and regulations related to 9-1-1 service, to assure it places emphasis and favors public safety versus the 9-1-1 service providers or telecommunications providers. The interest of the public and public safety should come first over the interest of commercial providers.
3. State and local 9-1-1 authorities should work with their Legislators to ensure that the funding required to support the current 9-1-1 services and future Next Generation 9-1-1 are adequate and available, and that the fees and funds collected from the citizens of their States for 9-1-1 services are dedicated and used solely for the purpose as intended for the implementation, operation and maintenance of 9-1-1 emergency telephone services as required by the Enhance911 Act of 2004(Pub. Law 108-494). In addition, the fees collected should be fairly and equally distributed to the 9-1-1 authorities.

Outstanding Issues

There appears to be no standards for 9-1-1 service providers to adhere to public safety grade requirements for backup power related to the systems that support 9-1-1 services.

Next Steps

1. COG should formalize a committee of 9-1-1 Directors that can address specific issues related to 9-1-1 emergency telecommunications service for the NCR
2. COG, with the assistance of the 9-1-1 authorities, should take the lead to work cooperatively in the development of a multi-year 9-1-1 strategic plan to include Next Generation 9-1-1

Conclusion

The Derecho's impact on 9-1-1 services and the ensuing public and industry reaction has been one of the most significant events in the history of enhanced 9-1-1 services in the United States. It is conclusive that there were many areas in which Verizon could have performed better related to their initial response to the issues the Derecho storm created. Questions still remain about the current reliability, age and condition of the Verizon infrastructure local governments rely on to provide life-saving 9-1-1 public services.

In the aftermath of the storm, Verizon has taken steps to address the issues of June 29, 2012. Verizon, however, has a responsibility to follow-up on the additional recommendations of this and other recommendations made to the FCC hearings. Verizon must continue to evaluate their ongoing operations, processes and best practices to mitigate the impacts of this type should it happen again. There is much Verizon must do to regain the confidence of the public safety community and citizens that their part in providing vital 9-1-1 communications service is highly reliable and sufficiently redundant on an ongoing basis.

There were no identifiable issues for the 9-1-1 centers during this event and all of their systems operated as designed. The public safety community, however, must also shoulder the responsibility to determine where improvements can be made and make plans for continuous improvements to meet new operational and technology challenges. State and federal government officials need to provide resources to the public safety community, and proper oversight, to allow the technology and human resources that are necessary to support the operations of the current 9-1-1 services as well as Next Generation 9-1-1 services.

Attachment 3



Verizon, 911 Service and the Derecho

***Moving Forward
Corrective Actions Update***

January 8, 2013

**Maureen Davis
Vice President Network Operations
MidAtlantic**



Power

The specific cause of the Northern Virginia 911 disruptions was the failure of one of two back-up generators to start in Arlington and Fairfax following the loss of commercial power. These problems are fixed.

Issue	Action Plan	Status
Arlington Back-up Power	<ul style="list-style-type: none">• Install new start batteries on Generator 1• Complete Generator 2 repairs• Complete full load transfer test (pending battery tests and run down testing)• Complete fuel system repairs• Update manual generator-starting procedure	Complete
Fairfax (Lee Hwy) Back-up Power	<ul style="list-style-type: none">• Install a new UPS on the Generator 2 Auto Transfer Switch (this solves the Generator 2 start failure)• Install a permanent Auto Transfer Switch power source via the inverter power plant that is tied to DC power plant batteries.	Complete



Power (cont'd)

Verizon's investigation revealed significant opportunities for improvement to ensure that best practices are followed and lessons learned are applied throughout Verizon's service territory.

Issue	Action Plan	Status
Generator system failures were different in each location. While the specific failures have been repaired, we have extended our review across the footprint to identify and address potential vulnerabilities.	<ul style="list-style-type: none">Conduct back-up power system audits in the mission-critical Verizon facilities supporting 911 in Virginia, Maryland and Washington, DC.These audits include ensuring the proper categorization of power alarms, as the investigation revealed that an alarm from Fairfax before the loss of network monitoring was mis-categorized and thus placed lower on the priority list.Institute any corrective measures identified in those power audits.Where multiple generators are present, we will institute automated controls to prioritize system loads so that critical elements (e.g., network monitoring) stay up or are restored first in case one of the two generators fails.	<ul style="list-style-type: none">Completed for VA, MD and DC sites: 10/17/12Power alarms tested for 3 most critical conditions for all Verizon central offices: 12/5/12<ul style="list-style-type: none">Remediation for such conditions is 98% completeCorrective actions for audit findings in progress. Most items will complete by 3/31/13; some items require longer time frames and are scheduled for 2Q13 and 3Q13.Arlington audit concluded that automated load shed not optimal solution; a 3rd permanent generator will be installed 3Q13. Existing portable generator to remain on site and connected until permanent one installed.



Power (cont'd)

Issue	Action Plan	Status
<p><u>Emergency Power Practices and Procedures</u></p> <p>Verizon will improve its speed of restoration of power, moving to manual starts where necessary without delay, prioritizing power to key network equipment (e.g., 911, monitoring systems) in multi-generator configurations, and improving its deployment of mobile generators.</p>	<ul style="list-style-type: none">• Implement site-specific back-up power system procedures at critical facilities to ensure real-time on-site accurate identification of power loss anywhere in the facility.• Create site-specific manual generator start and transfer procedures, including prioritized system loads, to ensure a rapid start in the case of failure of automated starting systems.• Enhance critical facility "Black Out" testing. We test our back-up power systems regularly, but will now include "failed automated controls" and "prioritized system load transfer" scenarios.• Improve training and testing compliance. Our investigation revealed that the generator in Arlington had been tested just prior to the Derecho, failed to start, and required service, but that procedures weren't followed that would have ensured speedy correction of those service issues and/or faster restoration of the office.	<p>Potomac-Complete Footprint-1Q 2013</p> <p>Potomac- Complete Footprint- 2013</p> <p>Field Blackout Tests 1Q13</p> <p>Complete</p>



Emergency Management Processes

More robust visibility into our network and crisis management processes will improve coordination and communication with PSAPs and other government/local officials.

Issue	Action Plan
<p>Verizon has a standard practice of internal mobilization based on actual or potential service impacts. These are triggered by alarms. The loss of visibility into our network prevented us from receiving these alarms and delayed our response.</p>	<ul style="list-style-type: none">• We have enhanced our event criteria and procedures for notification and mobilization to trigger activity more quickly when batteries are activated or when network monitoring is lost in multiple offices in a geographic area. <div data-bbox="1622 943 1962 1041" style="border: 1px solid black; padding: 5px; text-align: center;">Complete</div>
<p>Rapid identification of emergencies and transition to Emergency Management. The Derecho was initially treated more like an internal network problem than like a hurricane-type problem, and this affected incident management.</p>	<ul style="list-style-type: none">• Emergency Management has been centralized and enhanced so that all emergencies, including network emergencies, are managed by Verizon's National Emergency Coordination Center (NECC), which utilizes the National Incident Management System (NIMS) principles as published by the U.S. Department of Homeland Security. <div data-bbox="1622 1328 1962 1426" style="border: 1px solid black; padding: 5px; text-align: center;">Complete</div>



Verizon Network

Telemetry systems allow Verizon to receive alarms, monitor its network, identify the cause and location of problems, and repair them rapidly.

Issue	Action Plan
<p>Creating diverse connectivity and alternative telemetry sites will provide greater resiliency in crises. It will also improve the effectiveness of real-time communications with PSAPs.</p> <ul style="list-style-type: none">This initiative will enhance visibility into the 911 network. For example, our investigation revealed that the Eastern portion of Loudoun County could not reach the County's PSAP for several hours on June 30, but the loss of telemetry impeded effective communication with the PSAP on the issue.	<ul style="list-style-type: none">Redesign the telemetry network to include more diverse connections and failover (alternative) locations.Diversity guidelines for telemetry network published 8/15/12; implementation plan approved.Replaced major hub routers in Arlington with DC powered routers to extend telemetry life to that of office battery power – completed 1/3/13.Redesign telemetry edge routers to a core router that has generator and DC battery back-up. Virginia offices to complete by 6/30/13.Site-by-site remediation to upgrade the edge routers and move all telemetry traffic to the IP network across the entire Verizon Telecom footprint. All E911 tandem offices throughout that footprint will be finished by 12/31/13.



911/PSAPs

Verizon's analysis of the network impacts following the Derecho has identified areas for improvement with specific PSAP configurations, especially involving ALI and trunk diversity. Verizon will work directly with the specific PSAP partners to make those improvements.

Issue	Action Plan	Status
Opportunities for improved diversity on PSAP trunking and ALI links. Conduct network design review for all Maryland and Virginia PSAPs.	<ul style="list-style-type: none">Review PSAP trunking and ALI links for diversityWork with local Engineering and Operations team to remediate issues identified.	<ul style="list-style-type: none">Review completed for affected PSAPs in Northern Virginia 7/31/12.Virginia redesign recommendations ready for review; scheduled with PSAPs as available.Maryland reviews completed by 9/30/12 and reviewed with PSAPs in October and November. Redesign recommendations to follow.
A centrally inventoried 911 Infrastructure will facilitate trouble-shooting and improve restoration times.	<ul style="list-style-type: none">Develop a means to implement and maintain an inventory for E911 Infrastructure.	<ul style="list-style-type: none">Technical service managers to retain all currently developed network routing maps.Network routing maps will be integrated into new ticketing systems to allow for faster response and facilitate trouble-shooting and restoration.



Communications

- The 911 Directors of the City of Alexandria, and the Counties of Arlington, Fairfax, Loudoun, Prince William and Stafford have recommended that Verizon adopt five steps to improve communications and crisis response. Verizon has adopted those concepts.

Recommendation	Action Plan
<p>Verizon adopt, embrace, instruct, train and utilize the National Incident Management System (NIMS) model, to address and mitigate any and all significant events/incidents impacting providing 911 service to the aforementioned jurisdictions.</p> <p>Complete</p>	<ul style="list-style-type: none">Verizon employs an "all hazards approach" to its Business Continuity, Disaster Recovery, Facility Preparedness and Emergency Management programs. These are essential to the protection of its employees, critical business processes and structural facilities located around the globe.Verizon's National Emergency Coordination Center (NECC) process utilizes the National Incident Management System (NIMS) principles as published by the U.S. Department of Homeland Security. Verizon offers internal training and orientation courses on its NECC processes, and an Introduction to the National Incident Management System.



Communications (cont'd)

Recommendation	Action Plan
<p>Verizon obtain and utilize a Reverse 911® type system to notify, via voice and text, those persons identified by the above jurisdictions, as soon it is known or suspected by Verizon that there is or may be an interruption of 9-1-1 service to any or all of the above jurisdictions. The immediately transmitted voice and text message should contain, in plain language, the nature of the problem, current or potential impact of the problem, what Verizon is doing to address the problem, recommend actions the impacted 9-1-1 center(s) should take and other appropriate information and include the name of the sender and the telephone number (business and mobile) at which the sender can be reached, and their email address.</p> <p style="text-align: center;">Complete</p>	<ul style="list-style-type: none">Since March 2011, Verizon has employed a broadcast email process to provide specific ticket information to individual PSAPs, and also to provide general information and updates on issues that affect multiple PSAPs.Verizon has selected a tool for broadcast voice, text and email, and is working with 911 Directors to establish the correct contact lists and process details. Completed for VA, DC and MD: 10/30/12Metropolitan Washington Council of Governments (COG) 911 Steering Committee launched a communications subteam of representatives from VZ and each of the 3 COG regions to develop processes and thresholds for communications, PSAP profiles and shared information preferences.Verizon will make every effort to share actionable information with PSAPs as soon as we are aware of service interruptions. For events that may impact multiple PSAPs, we will recommend that voice conference bridges be established to enable Verizon to brief PSAPs on the situation and allow for questions and discussion. Recommended actions would be specific to each PSAP (based on their back-up configuration and event impact) and need to be developed jointly between Verizon and the PSAP.



Communications (cont'd)

Recommendation	Action Plan
<p>Verizon work with the jurisdictions to develop, by no later than December 31, 2012, a method to semi-annually conduct a drill/exercise with each jurisdiction on actions to be taken by Verizon and the impacted jurisdiction(s) in the event of a potential or actual 9-1-1 outage.</p>	<ul style="list-style-type: none">• Verizon engaged the assistance of its Business Continuity Emergency Management (BCEM) team to work with Verizon's 911 Customer Care Center organization to develop and exercise procedures for drills that model potential or actual 911 outages with any of the jurisdictions that request such a joint exercise.• First pilot exercise conducted with City of Norfolk on 12/04/12.
<p>Verizon provide the above jurisdictions, during the first week of each month, a current contact list; beginning with the name and contact information (email, business telephone number, business mobile telephone number and any other appropriate information) for the Verizon account manager assigned to the jurisdiction and four immediately escalating Verizon personnel up to a Vice President level.</p>	<ul style="list-style-type: none">• Based on discussions with the COG 911 communications subteam, it was decided that escalation lists would be provided quarterly (from Verizon to PSAPs), and updated if information changed in the interim. <div data-bbox="1267 1085 1584 1215" style="border: 1px solid black; padding: 10px; text-align: center;"><p>Complete</p></div>



Communications (cont'd)

Recommendation	Action Plan
<p>Verizon, if/when requested by any of the above jurisdictions, have a Verizon representative with authority to act/react; respond to and to be present at the jurisdictions' Emergency Operations Center (EOC), to provide current accurate information concerning 9-1-1 service and outages, other telephone service, etc. and liaison with other parties staffing the EOC, when the EOC is activated.</p> <p style="text-align: center;">Complete</p>	<ul style="list-style-type: none">• Verizon has committed to partnering with the Virginia Department of Emergency Management and staffing the state EOC in Richmond with a Verizon representative upon request in the event of an emergency. Staffed the Commonwealth EOC for Hurricane Sandy 10/28/12 – 10/31/12.• Verizon has discussed options for virtual participation in any EOC via an "instant messaging - like" application with Virginia emergency management leaders.• Verizon has discussed joint training with Fairfax Emergency Management personnel and would welcome the opportunity to participate in that activity. Staffed Fairfax EOC for Hurricane Sandy 10/29/12 – 10/30/12.• If PSAP discussions regarding a joint regional 911 EOC become the strategy, that would present an excellent vehicle for Verizon to be on site in one location serving multiple jurisdictions in an emergency situation.

Attachment 4

NEWS

Federal Communications Commission
445 12th Street, S.W.
Washington, D. C. 20554

News media Information 202 / 418-0500
Fax-On-Demand 202 / 418-2830
TTY 202/418-2555
Internet: <http://www.fcc.gov>
[ftp.fcc.gov](ftp://ftp.fcc.gov)

This is an unofficial announcement of Commission action. Release of the full text of a Commission order constitutes official action. See MCI v. FCC, 515 F 2d 385 (D.C. Cir 1974).

FOR IMMEDIATE RELEASE:
January 10, 2013

NEWS MEDIA CONTACT:
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FCC CHAIRMAN GENACHOWSKI ANNOUNCES ACTION TO STRENGTHEN RELIABILITY AND RESILIENCY OF 9-1-1 COMMUNICATIONS NETWORKS DURING MAJOR DISASTERS

*Based on findings and recommendations of a comprehensive inquiry into widespread 9-1-1 service failures in the Midwest and mid-Atlantic regions as a result of 2012 derecho storm;
Final report delivered by the FCC's Public Safety and Homeland Security Bureau*

Washington, D.C. – Federal Communications Commission Chairman Julius Genachowski today announced plans to launch a rulemaking to strengthen the reliability and resiliency nationwide of our country's 9-1-1 communications networks during major disasters. Widespread outages and disruptions to 9-1-1 services in the Midwest and mid-Atlantic regions – impacting more than 3.6 million people – led to an in-depth FCC inquiry into what went wrong, and what steps should be taken to better ensure public safety. The inquiry, conducted by the FCC's Public Safety and Homeland Security Bureau, included in-depth investigation, public comment and analysis culminating in a report released today entitled "The Impact of the June 2012 Derecho on Communications and Services: Report and Recommendations."

Chairman Genachowski said, "Americans must be able to reach 9-1-1, especially in times of natural disasters. Today's report on the June 2012 derecho finds that a number of preventable system failures caused major disruptions to communications providers' networks connecting to 9-1-1 call centers during and shortly after the storm. As a result, 9-1-1 was partially or completely unavailable to millions of Americans - in some instances, for several days.

"These failures are unacceptable and the FCC will do whatever is necessary to ensure the reliability of 9-1-1.

"The FCC will soon launch a rulemaking to improve the reliability of existing 9-1-1 networks and prevent failures like those outlined in today's report. We will also accelerate the Commission's Next Generation (NG) 9-1-1 agenda. NG networks harness the power of the Internet to improve the availability and reliability of 9-1-1 communications.

"Here's the bottom line: We can't prevent disasters from happening, but we can work relentlessly to make sure Americans can connect with emergency responders when they need to most."

About the 2012 Derecho and Impact on Midwest and Mid-Atlantic Regions

The derecho – a fast-moving, destructive, and deadly storm that developed on June 29, 2012 – caused widespread disruptions to communications, especially 9-1-1 services. Shortly after the derecho, Chairman Genachowski directed the FCC's Public Safety and Homeland Security Bureau to conduct an inquiry into the disruptions, including both the causes of the outages and ways to make the public safer by avoiding future outages.

In the report issued today, the Bureau noted that a significant number of 9-1-1 systems and services were partially or completely down for several days after the derecho – from isolated breakdowns in Ohio, New Jersey, Maryland, and Indiana to systemic failures in northern Virginia and West Virginia. In all, seventy-seven 9-1-1 call centers (known as public safety answering points or “PSAPs”) serving more than 3.6 million people in these six states lost some degree of connectivity, including vital information on the location of 9-1-1 calls. Seventeen of the 9-1-1 call centers, mostly in northern Virginia and West Virginia, lost service completely, leaving more than 2 million residents unable to reach emergency services for varying periods of time.

Summary of Report Findings

Unlike hurricanes and superstorms, which are generally well-forecast, derechos are more like earthquakes, tornados, and man-made events for which there is little-to-no advance notice and opportunity to prepare. As such, the derecho provided a snapshot of the reliability and readiness of a portion of the Nation’s communications infrastructure in the face of unanticipated disasters – and it revealed considerable flaws in the resiliency planning and implementation of the primary 9-1-1 network providers in the affected region. In most cases, the disruptions would have been avoided if the communications network providers that route calls to 9-1-1 call centers, had fully implemented industry best practices and available industry guidance.

Summary of Report Recommendations

The Bureau outlined specific suggestions to address the primary causes of the derecho-related outages and to promote the reliability and resiliency of 9-1-1 communications networks during disasters. Chief among these, the Bureau recommended that the Commission consider actions in the following areas to ensure that communications providers:

Maintain adequate central office backup power

The Bureau recommended that the Commission consider requiring communications providers to maintain robust and reliable backup power at their central offices, supported by appropriate testing, maintenance, and records procedures.

Have reliable network monitoring systems

The Bureau recommended that the Commission consider requiring providers to take steps to ensure that communications providers’ monitoring systems are reliable and resilient, and avoid cases where a single failure in a monitoring system causes a provider to lose visibility into a substantial part of its network.

Conduct periodic audits of 9-1-1 circuits

The Bureau recommended that the Commission consider requiring communications providers that route calls to 9-1-1 call centers to regularly audit their 9-1-1 circuits and the links that transmit location information for 9-1-1 calls.

Notify 9-1-1 call centers of problems

The Bureau recommended that the Commission provide more specific guidance, such as the level of information that should be included by service providers in their notifications to 9-1-1 call centers.

The Bureau also encouraged the deployment of Next Generation 9-1-1, which offers advantages over today's 9-1-1 systems that could have significantly lessened the derecho's impact on emergency communications.

In order to complete today's report, the Bureau conducted an extensive review of confidential outage reports, public comments and related documents, as well as interviews of many service providers and PSAPs, equipment and backup power vendors, and public safety and community officials.

As the Bureau was conducting its derecho inquiry, Superstorm Sandy hit the Northeast and Mid-Atlantic states. While today's report addresses the most significant communications issues that occurred in the wake of the derecho, primarily its devastating impact on the networks that connect 9-1-1 call centers, some information gathered during this inquiry also relates to broader network reliability and resiliency issues raised during Superstorm Sandy. These topics will be addressed in the Commission's upcoming field hearings on the challenges to communications networks during natural disasters and other crises.

The full Report is available via the below link:

http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-318331A1.pdf

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